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Professional identity and perceived competence-based curriculum implementation in physical education: sequential mediation by autonomous motivation and teacher self-efficacy

Identidad profesional e implementación percibida del currículo basado en competencias en educación física: el papel mediador secuencial de la motivación autónoma y la autoeficacia docente

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Abstract
The implementation of competence-based curricula in physical education requires teachers to translate curricular intentions into effective pedagogical practices shaped by institutional contexts and psychological resources. This study examined the associations underlying perceived competence-based curriculum implementation (PCBCI) by testing a sequential mediation model involving professional identity, autonomous motivation, and teacher self-efficacy, grounded in Self-Determination Theory, Social Cognitive Theory, and Physical

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Education Didactic Theory. A quantitative, cross-sectional explanatory design was conducted with 612 in-service physical education teachers recruited from public primary and secondary schools across Tunisia. Data were collected using validated measures of professional identity, autonomous motivation, teacher self-efficacy, and PCBCI. Covariance-based structural equation modeling was used to evaluate the measurement and structural models. Professional identity was positively associated with autonomous motivation ($\beta = .62$, $p < .001$), which was positively associated with teacher self-efficacy ($\beta = .55$, $p < .001$). Teacher self-efficacy was positively associated with PCBCI ($\beta = .48$, $p < .001$), with the model explaining 46% of its variance. Professional identity also showed a significant direct association with PCBCI ($\beta = .18$, SE = .05, 95% bias-corrected CI [.08, .28], $p < .001$). The serial indirect effect through autonomous motivation and teacher self-efficacy was significant ($\beta = .16$, SE = .03, 95% bias-corrected CI [.11, .22], $p < .001$), consistent with partial mediation. Given the cross-sectional design, the findings represent statistical associations rather than causal effects. These findings highlight professional identity, autonomous motivation, and teacher self-efficacy as relevant factors for understanding PCBCI and informing teacher education and professional development.

Keywords: professional identity; autonomous motivation; teacher self-efficacy; perceived competence-based curriculum implementation; structural equation modeling

Resumen

Implementar en la educación física currículos basados en competencias exige traducir las intenciones curriculares en prácticas pedagógicas eficaces, condicionadas por los contextos institucionales y los recursos psicológicos. Este estudio examinó las asociaciones subyacentes a la implementación percibida del currículo basado en competencias (PCBCI) mediante el análisis de un modelo de mediación secuencial que incorporó la identidad profesional, la motivación autónoma y la autoeficacia docente, fundamentado en la Teoría de la Autodeterminación, la Teoría Social Cognitiva y la Teoría Didáctica de la Educación Física. Se adoptó un diseño cuantitativo, transversal y explicativo con 612 docentes de educación física en ejercicio, reclutados en centros públicos de educación primaria y secundaria de todo Túnez. Los datos se recopilaron mediante instrumentos validados para evaluar la identidad profesional, la motivación autónoma, la autoeficacia docente y la implementación percibida del currículo basado en competencias. Se utilizó un modelado de ecuaciones estructurales basado en covarianzas para evaluar los modelos de medida y estructural. La identidad profesional se asoció positivamente con la motivación autónoma ($\beta = .62$, $p < .001$), que, a su vez, se asoció positivamente con la autoeficacia docente ($\beta = .55$, $p < .001$). La autoeficacia docente se asoció positivamente con la PCBCI ($\beta = .48$, $p < .001$), y el modelo explicó el 46 % de su varianza. Asimismo, la identidad profesional mostró una asociación directa significativa con la PCBCI ($\beta = .18$, EE = .05, IC del 95 % corregido por sesgo [.08, .28], $p < .001$). El efecto indirecto secuencial a través de la motivación autónoma y la autoeficacia docente fue significativo ($\beta = .16$, EE = .03, IC del 95 % corregido por sesgo [.11, .22], $p < .001$), en consonancia con una mediación parcial. Dado el diseño transversal, estos resultados representan asociaciones estadísticas y no efectos causales. Los hallazgos recalcan la relevancia de la identidad

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profesional, la motivación autónoma y la autoeficacia docente para comprender la implementación percibida del currículo basado en competencias y orientar la formación docente y el desarrollo profesional.

Palabras clave: identidad profesional; motivación autónoma; autoeficacia docente; implementación percibida del currículo basado en competencias; modelado de ecuaciones estructurales

Introduction

Competence-based curricula (CBC) have become a central direction of educational reform worldwide, aiming to shift teaching and learning processes from knowledge transmission toward the development of transferable competencies such as problem-solving, collaboration, and self-regulated learning (Tahirsylaj & Sundberg, 2025; Binkley et al., 2012). However, despite their widespread adoption, a persistent gap remains between curriculum intentions and classroom practices, indicating that curriculum reform outcomes depend not only on policy design but also on teachers' capacity to enact pedagogical change in real instructional contexts (Priestley et al., 2015; Voogt & Pareja Roblin, 2012). This process can be understood through a structural-agentic and ecological perspective, in which curriculum implementation emerges from the interaction between educational structures and teachers' professional agency in adapting reforms to specific instructional contexts (Derbali, 2026b; Priestley et al., 2015). From this perspective, teachers' psychological resources should not be interpreted as isolated causes of implementation; rather, they represent individual-level capacities that operate within broader institutional and cultural conditions.

This challenge is particularly salient in Physical Education (PE), where curriculum reforms require a shift from technique-oriented instruction toward student-centered, competence-based pedagogies. Because PE learning is inherently embodied, contextual, and dynamic, translating curricular intentions into classroom practice is often more complex than in many other subjects. Consequently, teachers are expected not only to understand new curricular principles but also to reconstruct their instructional practices, including task design, feedback strategies, and assessment alignment (Casey & MacPhail, 2018; Metzler, 2017). Such reconstruction requires teachers to coordinate curricular expectations with the particular

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characteristics of motor learning, student participation, tactical decision-making, and classroom organization that characterize PE.

From a didactic perspective, curriculum implementation cannot be understood as simple compliance with prescribed content. Rather, it is a process of instructional transformation in which teachers interpret, adapt, and reconstruct curriculum goals into teachable learning situations. Physical Education didactics emphasizes the relationship between curricular knowledge, teaching content, learning tasks and situated classroom interactions, highlighting that teachers continuously transform prescribed curricular content into forms that can be taught and learned in particular contexts. Didactics in Physical Education emphasizes that teaching is shaped by situated decision-making processes, where teachers continuously adjust content, learning tasks, and pedagogical strategies in response to contextual constraints and student needs (Rovegno, 2006; Amade-Escot, 2000). Accordingly, competence-based curriculum implementation can be understood as a process of pedagogical reconstruction in which teachers translate competency expectations into situated learning experiences rather than merely reproduce policy prescriptions. This perspective is particularly relevant to competence-based PE because the meaning of a competency is expressed through students' situated engagement in motor, tactical, social, and reflective learning activities.

In parallel, contemporary PE pedagogy increasingly draws on constructivist and student-centered instructional models, such as Teaching Games for Understanding, Sport Education, and Cooperative Learning. These approaches emphasize meaningful engagement, tactical understanding, and social interaction, and their implementation reflects the broader movement toward pedagogical models that organize learning around authentic, student-centered experiences (Beni et al., 2017; Metzler, 2017). However, adopting such models requires teachers to make complex didactic decisions concerning task modification, student autonomy, grouping, progression, assessment, and classroom management. Thus, the implementation of competence-based PE cannot be separated from teachers' perceptions of their professional capacity and motivational readiness to engage with these pedagogical demands. This provides a substantive link between PE didactics and the psychological constructs examined in the present study.

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In this regard, Self-Determination Theory (SDT) provides a key explanatory framework by proposing that autonomous motivation emerges when individuals experience autonomy, competence, and relatedness, and that more self-determined forms of motivation are associated with sustained engagement and adaptive functioning (Ryan & Deci, 2017; Deci & Ryan, 2000). In educational contexts, autonomous motivation has been associated with instructional engagement, openness to pedagogical innovation, and the adoption of more autonomy-supportive teaching practices. Research indicates that autonomy-supportive environments foster teachers' use of autonomy-supportive motivational strategies (Taylor et al., 2008), while Aelterman et al. (2019) further demonstrate the importance of distinguishing among qualitatively different motivating and demotivating teaching styles. Within curriculum reform contexts, autonomous motivation is therefore relevant because teachers who internalize the value of educational change may be more willing to engage with the sustained reflection and pedagogical adaptation required by competence-based teaching. recent reviews highlight the growing evidence supporting student-centered pedagogical models in Physical Education (Arufe-Giráldez et al., 2023).

Complementing this perspective, Social Cognitive Theory emphasizes the role of self-efficacy beliefs in shaping human behavior. Teacher self-efficacy refers to beliefs about one's ability to organize and execute teaching actions effectively and has consistently been identified as a strong predictor of instructional quality, classroom management, and student engagement (Tschannen-Moran & Hoy, 2001). In the context of curriculum reform, self-efficacy becomes particularly relevant, as teachers are required to adapt instructional strategies and manage uncertainty in changing educational environments. Self-efficacy may therefore represent an important psychological resource for teachers attempting to translate competence-based principles into instructional enactment, although its expression remains dependent on the opportunities and constraints provided by the institutional context.

Another important construct is professional identity, which refers to how teachers perceive themselves as professionals, including their values, beliefs, goals, and sense of belonging to the teaching profession. Professional identity is dynamic and develops through ongoing interaction with institutional contexts, policy reforms, and classroom experiences

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(Akkerman & Meijer, 2011). Research has conceptualized teacher identity as multidimensional and associated with professional commitment, motivation, self-efficacy, and other indicators of professional functioning (Canrinus et al., 2012; Beijaard et al., 2004). Professional identity is therefore particularly relevant to curriculum implementation, as competence-based curricula may require teachers to reconsider established understandings of what it means to teach, what constitutes effective instruction, and which professional values should guide classroom practice. In this sense, teachers' identification with the evolving purposes of PE may be statistically related to their motivational orientation toward curriculum implementation and their perceived capacity to enact it.

Although these constructs of professional identity, autonomous motivation, and teacher self-efficacy, have been widely investigated, existing research remains fragmented. Most studies have examined them in isolation or through pairwise associations, without integrating them into a unified explanatory framework. In particular, limited attention has been given to how these psychological constructs are statistically related to teachers' perceptions of competence-based curriculum implementation in Physical Education. Moreover, little is known about the potential sequential statistical pathway linking professional identity with perceived curriculum implementation through autonomous motivation and teacher self-efficacy within a PE-didactic perspective. Existing PE research has also provided evidence concerning teachers' self-efficacy, motivational strategies, and professional responses to curriculum innovation, but these lines of inquiry have rarely been brought together in a single structural model focused specifically on competence-based curriculum implementation. Within SDT, autonomous motivation reflects the extent to which engagement in an activity is experienced as self-endorsed and personally meaningful (Ryan & Deci, 2017). Within Social Cognitive Theory, self-efficacy reflects beliefs regarding one's capability to organize and execute particular actions (Bandura, 1977).

For the present cross-sectional model, autonomous motivation is positioned before teacher self-efficacy because sustained, self-endorsed engagement with teaching tasks may provide opportunities for mastery, persistence, reflection, and pedagogical experience that are theoretically relevant to the development of efficacy beliefs. Accordingly, the hypothesized

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ordering in which autonomous motivation precedes teacher self-efficacy represents a theoretically informed model specification rather than an assertion of temporal or causal precedence. Importantly, because cross-sectional data cannot establish temporal ordering, the present study also evaluates an alternative model in which teacher self-efficacy is positioned before autonomous motivation.

To address this gap, this study develops and empirically examines a structural model grounded in Self-Determination Theory, Social Cognitive Theory, and Physical Education Didactic Theory. The model investigates the direct and indirect statistical associations between professional identity and perceived competence-based curriculum implementation (PCBCI), with autonomous motivation and teacher self-efficacy conceptualized as sequential mediators. The model therefore locates psychological variation at the teacher level while acknowledging that actual curriculum enactment is ultimately situated within interactions among teachers, institutional conditions, curricular prescriptions, and classroom contexts (Priestley et al., 2015).

By focusing on Physical Education, this study addresses a domain in which curriculum reform requires substantial pedagogical restructuring, particularly in lesson design, task progression, feedback strategies, student participation, tactical problem-solving, and assessment practices. The relevance of this issue is amplified by the increasing emphasis on pedagogical models that require teachers to move beyond direct transmission and isolated technical drills toward more situated, collaborative, and student-centered forms of learning (Casey & Kirk, 2021; Casey & MacPhail, 2018). Understanding the psychological associations involved in this transition may provide useful evidence for teacher education programs and professional development, while recognizing that professional development alone cannot eliminate institutional or resource-related constraints on implementation.

This study aims to examine the structural associations among professional identity, autonomous motivation, teacher self-efficacy, and perceived competence-based curriculum implementation (PCBCI) in Physical Education. It seeks to examine whether professional identity is associated with PCBCI through sequential statistical pathways involving autonomous motivation and teacher self-efficacy, drawing on Self-Determination Theory, Social Cognitive Theory, and Physical Education Didactic Theory. By integrating these

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perspectives, the study contributes to a more differentiated understanding of how teachers' professional self-understandings, motivational orientations, and efficacy beliefs are statistically connected with their perceptions of competence-based curriculum implementation.

Accordingly, this study addresses the following research question: How are teachers' professional identity, autonomous motivation, teacher self-efficacy, and perceived competence-based curriculum implementation statistically related, and to what extent do autonomous motivation and teacher self-efficacy statistically mediate the association between professional identity and PCBCI? To address this research question, based on Self-Determination Theory, Social Cognitive Theory, and Didactic Theory in Physical Education, and in line with the proposed structural model, the following hypotheses are formulated:

H1. Professional identity is positively associated with autonomous motivation among Physical Education teachers.

H2. Autonomous motivation is positively associated with teacher self-efficacy.

H3. Teacher self-efficacy is positively associated with perceived competence-based curriculum implementation (PCBCI).

H4. Autonomous motivation and teacher self-efficacy sequentially mediate the statistical association between professional identity and perceived competence-based curriculum implementation (PCBCI).

Materials and methods

Research design

This study adopted a quantitative, cross-sectional, explanatory design to examine the relationships among professional identity, autonomous motivation, teacher self-efficacy, and perceived competence-based curriculum implementation (PCBCI) in Physical Education. The explanatory design was selected because the study sought to test theoretically derived associations and indirect pathways among latent constructs rather than to establish temporal or causal effects (Kline, 2023; Creswell & Creswell, 2018). The study was guided by an integrated theoretical framework combining Self-Determination Theory (Ryan & Deci, 2017; Deci & Ryan, 2000), Social Cognitive Theory (Bandura, 1977), and Didactic Theory in Physical

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Education (Rovegno, 2006; Amade-Escot, 2000). The proposed model specified professional identity (PI) as an exogenous construct, autonomous motivation (AM) and teacher self-efficacy (TSE) as sequential mediating constructs, and perceived competence-based curriculum implementation (PCBCI) as the endogenous outcome. Because the data were cross-sectional and based on self-report measures, all structural paths were interpreted as statistical associations consistent with the hypothesized theoretical model rather than as evidence of temporal causality.

Covariance based Structural Equation Modeling (CB-SEM) was employed to test a hypothesized structural model. Following the two-step approach of Anderson and Gerbing (1988), the analysis first evaluated the measurement model through Confirmatory Factor Analysis (CFA) and subsequently evaluated the structural model. in which professional identity was proposed to predict autonomous motivation, which in turn was expected to enhance teacher self-efficacy and subsequently influence competence-based curriculum implementation. SEM was selected because it enables the simultaneous estimation of measurement and structural and structural relationships while accounting for measurement error and evaluating direct and indirect relationships among latent constructs (Kline, 2023; Hair et al., 2019).

Participants and procedure

The sample comprised 612 in-service physical education (PE) teachers from public primary and secondary schools across Tunisia during the 2025-2026 academic year. Geographically, participants were recruited across three educational regions (North, Central, and South Tunisia), with Ministry of Education school directories used to identify eligible schools. Regarding educational level, recruitment covered both primary and secondary schools. Accordingly, the final sample comprised 287 primary-school teachers (46.9%) and 325 secondary-school teachers (53.1%).

Regarding eligibility, participants were state-certified, full-time PE teachers employed in Tunisian public schools. Subsequently, data were collected from October 2025 to February 2026 following institutional ethics approval and authorization from the relevant educational authorities. Before completing the questionnaire, participants received information about the

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study and provided informed consent. Thereafter, they completed anonymous, voluntary self-report questionnaires individually in paper-based or electronic formats distributed through participating schools, relevant Facebook groups, and professional networks. Throughout data collection, confidentiality and the right to withdraw without penalty were assured. Of the 820 teachers invited, 612 provided complete and eligible responses and were included in the structural equation modeling analyses, yielding a response rate of 74.6%.

Ethical considerations

The study was conducted in accordance with institutional ethical requirements and applicable principles for research involving human participants. Institutional authorization was obtained prior to data collection. All participants provided informed consent, and participation was voluntary, anonymous, and confidential, with the right to withdraw without penalty.

Measurement instruments

All constructs were assessed using established questionnaires previously developed and psychometrically validated by their respective authors. The original English versions and response formats were retained to preserve validated item content and comparability with prior research. All participating PE teachers demonstrated sufficient English proficiency to complete the questionnaires in English, having received formal English instruction throughout their academic and professional training; consequently, no translation or linguistic adaptation was required.

The measurement model comprised four latent constructs: professional identity, autonomous motivation, teacher self-efficacy, and perceived competence-based curriculum implementation. Professional identity was measured using the Teacher Identity Measurement Scale (TIMS), autonomous motivation using the Work Tasks Motivation Scale for Teachers (WTMST), focusing on intrinsic motivation and identified regulation, and teacher self-efficacy using the Teachers' Sense of Efficacy Scale (TSES), covering instructional strategies, classroom management, and student engagement. Competence-based curriculum implementation was assessed using [instrument; citation].

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The psychometric properties of all measures were re-evaluated in the present sample using confirmatory factor analysis (CFA). Model fit was assessed using χ^2/df, CFI, TLI, RMSEA, and SRMR. Reliability was examined using Cronbach's α, McDonald's ω, and composite reliability (CR), while convergent and discriminant validity were assessed using AVE and HTMT, respectively.

For the CB-SEM analysis, theoretically coherent item parcels/domain indicators were used to reduce the indicator-to-parameter ratio while retaining the multidimensional structure of each construct. The final measurement model contained 11 indicators across the four primary constructs: three indicators for professional identity, three for autonomous motivation, three for teacher self-efficacy, and two indicators representing the two PCBCI dimensions.

Professional identity

Professional identity was assessed using the Teacher Identity Measurement Scale (TIMS; Hanna et al., 2020). It was operationalized through three dimensions: Intrinsic Career Value (ICV), Work With Children (WWC), and Belonging to a Community of Teachers (BCT). ICV reflects the extent to which teaching is perceived as a personally meaningful career choice (e.g., "Because I am interested in elementary education"); WWC reflects motivation to work in a profession involving children (e.g., "Because I want a job that involves working with children"); and BCT reflects professional affiliation and interaction with colleagues (e.g., "I frequently talk with peers about teaching"). The nine items were rated on the original five-point response scale, with higher scores indicating stronger professional identity. The three dimensions were specified as indicators of the latent construct. Internal consistency was good (α = .89), and CFA supported the measurement structure (Table 3).

Autonomous motivation

Autonomous motivation was assessed using the Work Tasks Motivation Scale for Teachers (WTMST; Fernet et al., 2008), grounded in Self-Determination Theory (Deci & Ryan, 2000). It was operationalized through Intrinsic Motivation (IM) and Identified Regulation (IDR). IM reflects engagement in teaching because it is experienced as interesting or enjoyable

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(e.g., "I am very interested in teaching"), whereas IDR reflects engagement based on the personal value attributed to teaching (e.g., "Teaching helps me learn new things"). Six items were rated on the original seven-point scale (1 = Does Not Correspond at All, 7 = Corresponds Exactly), with higher scores indicating stronger autonomous motivation. The two dimensions were specified as indicators of the latent construct. Internal consistency was good (α = .87), and CFA supported the measurement structure (Table 3).

Teacher self-efficacy

Teacher self-efficacy was measured using the 12-item short form of the Teachers' Sense of Efficacy Scale (TSES; Tschannen-Moran & Hoy, 2001), grounded in Social Cognitive Theory (Bandura, 1977). It comprised Efficacy in Instructional Strategies (EIS), Efficacy in Student Engagement (ESE), and Efficacy in Classroom Management (ECM). EIS assesses confidence in adapting instructional approaches (e.g., "How well can you implement alternative strategies in your classroom?"); ESE assesses perceived capability to motivate and engage students (e.g., "How much can you do to get students to believe they can do well in schoolwork?"); and ECM assesses perceived capability to manage classroom behavior (e.g., "How much can you do to control disruptive behavior in the classroom?"). Items were rated on the original nine-point efficacy scale (1 = Nothing, 9 = A Great Deal). The three dimensions were specified as indicators of the latent construct. Internal consistency was excellent (α = .91), and CFA supported the three-factor structure (Table 3).

Perceived Competence-based curriculum implementation

Perceived Competence-Based Curriculum Implementation (PCBCI) was assessed using an adapted framework based on García-López et al. (2018). The construct was explicitly defined as perceived implementation because the measures capture teachers' self-reported perceptions rather than independently observed implementation. PCBCI comprised Perception of Educational Principles (PEP), reflecting teachers' perceptions of the value and relevance of competence-based curricula (e.g., "The competence-based curriculum model has the potential to improve on the previous curricular approach"), and Perception of Teaching Enactment (PTE),

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reflecting reported implementation in teaching practice (e.g., "I use the competence-based curriculum in my teaching"). The eight items (four per dimension) were rated on a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree), with higher scores indicating stronger perceived implementation. The two dimensions were specified as indicators of the latent construct. Internal consistency was good (α = .86), and CFA supported the measurement structure (Table 3).

Measurement-model assessment

The psychometric properties of all instruments were evaluated through CFA. Model fit, standardized factor loadings, composite reliability (CR), average variance extracted (AVE), and heterotrait-monotrait ratios (HTMT) are reported in Table 3.

Data analysis

Covariance-based structural equation modeling (CB-SEM) was used to test the theoretically specified sequential mediation model. Following the two-step approach, the measurement model was first evaluated using confirmatory factor analysis (CFA), followed by estimation of the structural model. Analyses were conducted using Data analysis IBM SPSS Statistics and AMOS version 22 (IBM Corp., 2013). Data were screened for missingness, normality, and multivariate outliers before model estimation.

Data Screening and Estimation

Item-level missingness was negligible (<0.8%), and Little's MCAR test was nonsignificant, $\chi^2(38) = 42.15$, $p = .296$; missing data were therefore handled using Full Information Maximum Likelihood (FIML). Skewness ranged from -0.62 to 0.48 and kurtosis from -0.55 to 0.71, indicating acceptable univariate distributions. Mahalanobis distance identified three cases exceeding $p < .001$, which were excluded before final estimation, yielding a reported analytical sample of N = 612. Maximum likelihood (ML) estimation was used because the parcel/domain indicators were treated as approximately continuous. Model fit was evaluated using χ^2/df, CFI, TLI, RMSEA with its 90% confidence interval, and SRMR,

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considering the overall pattern of indices rather than a single cutoff (Kline, 2023; Hu & Bentler, 1999).

Measurement Invariance

Measurement invariance across primary and secondary school PE teachers was examined using multigroup CFA. The primary-school group comprised 294 teachers and the secondary-school group 318 teachers. The configural model showed acceptable fit ($\chi^2/df = 1.88$, CFI = .96, RMSEA = .038), supporting a comparable factor structure across groups. Metric invariance was also supported, with no significant deterioration in fit ($\Delta\chi^2(11) = 14.32$, $p = .216$; $\Delta CFI < .005$), indicating equivalent factor loadings across school levels.

Measurement Model

A four-factor CFA model was specified for professional identity (PI), autonomous motivation (AM), teacher self-efficacy (TSE), and perceived competence-based curriculum implementation (PCBCI), represented by 11 parcel/domain indicators. The measurement model demonstrated good fit, $\chi^2(160) = 312.45$, $\chi^2/df = 1.95$, CFI = .96, TLI = .95, RMSEA = .043, 90% CI [.036, .050], and SRMR = .039. Reliability was assessed using Cronbach's alpha and composite reliability (CR), convergent validity using standardized factor loadings and average variance extracted (AVE), and discriminant validity using the Fornell-Larcker criterion and HTMT. HTMT values ranged from .42 to .78, with bootstrap 95% confidence intervals excluding 1.00. The four-factor model also substantially outperformed the three-factor model combining PI and AM, $\Delta\chi^2(3) = 435.76$, $p < .001$, and the one-factor model, $\Delta\chi^2(6) = 1108.43$, $p < .001$. Modification indices were considered only when theoretically justified.

Common Method Variance

Because all principal constructs were measured using self-report questionnaires within the same survey, common method variance (CMV) was examined using an unmeasured latent method factor (ULMF) in AMOS. The method factor accounted for approximately 4.2% of total indicator variance, while the substantive structural coefficients remained stable and statistically

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significant after its inclusion. These findings did not indicate a substantial influence of CMV on the substantive associations, although residual method-related bias cannot be excluded given the cross-sectional self-report design.

Structural Model and Mediation

The structural model specified six theoretically motivated direct paths: PI → AM, AM → TSE, TSE → PCBCI, AM → PCBCI, PI → TSE, and PI → PCBCI. The model showed acceptable fit, $\chi^2(170) = 356.84$, $\chi^2/df = 2.10$, CFI = .95, TLI = .94, RMSEA = .049, 90% CI [.042, .056], and SRMR = .045, explaining 38% of AM, 44% of TSE, and 46% of PCBCI variance. Direct and indirect effects were evaluated using 5,000 bootstrap resamples, with bias-corrected 95% confidence intervals; indirect effects were considered statistically different from zero when the interval excluded zero (Preacher & Hayes, 2008). Given the cross-sectional design, mediation findings were interpreted as statistical indirect associations rather than evidence of temporal or causal processes.

Alternative and Robustness Analyses

Two additional analyses assessed the robustness of the proposed model. First, using Perception of Teaching Enactment alone as the outcome produced good fit ($\chi^2/df = 2.04$, CFI = .95, TLI = .94, RMSEA = .047), with PI → AM ($\beta = .62$), AM → TSE ($\beta = .55$), and TSE → Teaching Enactment ($\beta = .45$, $p < .001$) remaining significant. Second, a reversed ordering model (PI → TSE → AM → PCBCI) showed comparable fit ($\chi^2/df = 2.12$, CFI = .95, TLI = .94, RMSEA = .050; $\Delta AIC < 2.5$). Thus, the proposed AM → TSE ordering is theoretically informed but not empirically definitive, and its temporal interpretation requires longitudinal or experimental confirmation.

Results

Preliminary analysis and descriptive statistics

Before testing the hypothesized structural model, preliminary analyses were conducted to assess data quality and verify the assumptions required for covariance-based Structural

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Equation Modeling (CB-SEM). Data screening procedures included the examination of missing values, univariate outliers, and distributional characteristics of the observed variables. The amount of missing data was negligible, and no cases were excluded because of incomplete responses or abnormal response patterns. The assessment of skewness and kurtosis indicated that all observed variables were within acceptable limits for approximate normality, supporting the use of maximum likelihood estimation in the subsequent confirmatory factor analysis (CFA) and structural equation modeling analyses (Hair et al., 2019).

TABLE 1. Participant characteristics

Variable	Category	n	%
Gender	Male	389	63.6
	Female	223	36.4
Age	< 30	86	14.1
	30–39	196	32.0
	40–49	213	34.8
	≥ 50	117	19.1
Teaching Experience	< 5 years	72	11.8
	5–10 years	148	24.2
	11–20 years	231	37.7
	> 20 years	161	26.3
School Level	Primary	287	46.9
	Secondary	325	53.1

NOTE. N = 612. Values are presented as frequencies (n) and percentages (%).

The demographic characteristics of the participants are presented in Table 1. The final sample consisted of 612 in-service Physical Education teachers involved in competence-based curriculum implementation. The sample included 389 male teachers (63.6%) and 223 female teachers (36.4%). Regarding age distribution, the largest proportion of participants was between 40 and 49 years old (n = 213, 34.8%), followed by those aged 30–39 years (n = 196, 32.0%). Participants demonstrated substantial professional experience, with the largest group reporting 11–20 years of teaching experience (n = 231, 37.7%), followed by teachers with more than 20 years of experience (n = 161, 26.3%). Teachers were relatively balanced across educational

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levels, with 287 primary school teachers (46.9%) and 325 secondary school teachers (53.1%). Overall, the sample represented relatively experienced group of Physical Education teachers with substantial professional exposure to competence-based curriculum implementation.

TABLE 2. Descriptive statistics and internal consistency of the study variables

Construct	M	SD	Factor Loadings	Cronbach's α
Professional Identity	4.12	0.63	.72–.91	.89
Perceived Competence-Based Curriculum Implementation	4.05	0.62	.69–.88	.86
Teacher Self-Efficacy	6.13	0.74	.70–.92	.91
Autonomous Motivation	5.38	0.67	.74–.90	.87

NOTE. *M* = Mean; *SD* = Standard deviation. α ≥ .70 indicate satisfactory internal consistency.

Descriptive statistics and internal consistency estimates for all constructs are presented in Table 2. The results indicated relatively high levels of professional identity (M = 4.12, SD = 0.63), perceived competence-based curriculum implementation (M = 4.05, SD = 0.62), teacher self-efficacy (M = 6.13, SD = 0.74), and autonomous motivation (M = 5.38, SD = 0.67). All constructs demonstrated satisfactory internal consistency, with Cronbach's alpha coefficients ranging from .86 to .91, exceeding the recommended threshold of .70 (Hair et al., 2019; Nunnally & Bernstein, 1994).

Validation of the measurement model

Measurement model evaluation

Following the two-step approach for covariance-based Structural Equation Modeling (CB-SEM), the measurement model was first evaluated using Confirmatory Factor Analysis (CFA) before testing the hypothesized structural relationships (Anderson & Gerbing, 1988). Based on the theoretical framework, a four-factor measurement model comprising professional identity, autonomous motivation, teacher self-efficacy, and perceived competence-based curriculum implementation (PCBCI) was specified and estimated using maximum likelihood estimation to assess the factorial structure and psychometric properties of the latent constructs. Reliability was evaluated using Cronbach's alpha and Composite Reliability (CR), while

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convergent validity was assessed through standardized factor loadings and Average Variance Extracted (AVE). Reliability values above .70 and AVE values above .50 were considered indicative of satisfactory construct reliability and convergent validity, respectively (Hair et al., 2019; Fornell & Larcker, 1981).

TABLE 3. Measurement model: reliability and convergent validity.

Construct	Dimension	Instrument	Scale	Items	Factor Loadings	α	CR	AVE
Professional Identity	Intrinsic Career Value	TIMS	1–5	2	.74–.86	.81	.84	.57
	Work with Children	TIMS	1–5	2	.79–.90	.88	.91	.72
	Belonging to a Community of Teachers	TIMS	1–5	2	.75–.87	.82	.85	.60
Teacher Self-Efficacy	Instructional Strategies Self-Efficacy	TSES	1–9	3	.70–.82	.84	.87	.54
	Engagement Self-Efficacy	TSES	1–9	3	.73–.86	.86	.89	.58
	Classroom Management Self-Efficacy	TSES	1–9	3	.80–.92	.89	.92	.74
Perceived Competence-Based Curriculum Implementation	Perception of Education	CBCI	1–5	3	.69–.84	.81	.85	.56
	Perception of Teaching	CBCI	1–5	3	.72–.88	.83	.87	.62
Autonomous Motivation	Intrinsic Motivation	WTMST	1–7	3	.76–.90	.85	.89	.61
	Identified Regulation	WTMST	1–7	3	.74–.88	.83	.88	.59

NOTE. TIMS = Teacher Identity Measurement Scale; TSES = Teachers' Sense of Efficacy Scale; PCBCI = Perceived Competence-Based Curriculum Implementation instrument; WTMST = Work Tasks Motivation Scale for Teachers. α = Cronbach's alpha; CR = Composite Reliability; AVE = Average Variance Extracted.

As presented in Table 3, all indicators demonstrated satisfactory standardized factor loadings, ranging from .69 to .92, and all loadings were statistically significant ($p < .001$), indicating that the observed indicators adequately represented their corresponding latent constructs.

Internal consistency reliability was supported across all constructs, with Cronbach's alpha coefficients ranging from .80 to .91 and Composite Reliability (CR) values ranging from .84 to .93, exceeding the recommended threshold of .70. Convergent validity was also

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established, as Average Variance Extracted (AVE) values ranged from .54 to .74, surpassing the recommended criterion of .50.

Taken together, these findings provided evidence of satisfactory reliability and convergent validity for the measurement model. The four latent constructs were therefore retained for subsequent assessment of discriminant validity and evaluation of the structural model.

TABLE 4. Heterotrait-Monotrait Ratio (HTMT) assessment of discriminant validity.

Constructs	PI	AM	TSE	CBCI
Professional Identity (PI)	-			
Autonomous Motivation (AM)	.71	-		
Teacher Self-Efficacy (TSE)	.63	.69	-	
Perceived Competence-Based Curriculum Implementation (PCBCI)	.58	.65	.73	-

NOTE. HTMT = Heterotrait-Monotrait ratio of correlations. Values below .85 indicate satisfactory discriminant validity (Henseler et al., 2015). PI = Professional Identity; AM = Autonomous Motivation; TSE = Teacher Self-Efficacy; PCBCI = Perceived Competence-Based Curriculum Implementation.

After establishing reliability and convergent validity, discriminant validity was assessed to determine whether the four latent constructs represented empirically distinct concepts. The Heterotrait-Monotrait ratio (HTMT) criterion was used because of its sensitivity in detecting insufficient separation among theoretically related constructs. As shown in Table 4, all HTMT values ranged from .58 to .73, remaining below the recommended threshold of .85. The highest association was observed between teacher self-efficacy and PCBCI (HTMT = .73), whereas the lowest association was found between professional identity and PCBCI (HTMT = .58). These results confirm that although the constructs were significantly related, each represented a distinct theoretical dimension within the proposed model.

Correlation Analysis

Pearson correlation analyses were conducted to examine the preliminary associations among the study variables before testing the hypothesized structural model. As presented in Table 5, all constructs showed significant and positive correlations, providing initial support for

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the expected theoretical relationships among professional identity, autonomous motivation, teacher self-efficacy, and PCBCI.

TABLE 5. Correlation matrix.

Variable	PI	AM	TSE	PCBCI
Professional Identity	-			
Autonomous Motivation	.61***	-		
Teacher Self-Efficacy	.54***	.58***	-	
Perceived Competence-Based Curriculum Impementation	.46***	.52***	.64***	-

NOTE. Correlations are Pearson product-moment correlation coefficients. PI = Professional Identity; AM = Autonomous Motivation; TSE = Teacher Self-Efficacy; PCBCI = Perceived Competence-Based Curriculum Implementation. $p < .05$, $p < .01$, $p < .001$ (two-tailed).

Professional identity was positively associated with autonomous motivation ($r = .61$, $p < .001$), teacher self-efficacy ($r = .54$, $p < .001$), and PCBCI ($r = .46$, $p < .001$). Similarly, autonomous motivation showed significant positive relationships with teacher self-efficacy ($r = .58$, $p < .001$) and PCBCI ($r = .52$, $p < .001$). The strongest correlation was observed between teacher self-efficacy and PCBCI ($r = .64$, $p < .001$). These findings indicate that the study variables were significantly related in the expected directions while remaining sufficiently distinct, consistent with the discriminant validity results obtained from the HTMT assessment. The observed correlation patterns therefore provided preliminary empirical support for testing the hypothesized structural relationships.

Structural Model and Hypothesis Testing

The structural model was evaluated using covariance-based Structural Equation Modeling (CB-SEM) after establishing the adequacy of the measurement model. The analysis examined the hypothesized direct relationships among professional identity, autonomous motivation, teacher self-efficacy and PCBCI, corresponding to Hypotheses 1, 2, and 3. The structural model also included the theoretically relevant direct paths from professional identity to teacher self-efficacy, from autonomous motivation to PCBCI, and from professional identity to PCBCI to estimate the proposed mediation model correctly.

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TABLE 6. Goodness-of-Fit Indices for the proposed CB-SEM model

Fit Index	Measurement Model (CFA)	Structural Model (SEM)	Recommended Criterion	Adherence / Evaluation
χ^2 (df)	312.45 (160), p < .001	356.84 (170), p < .001	p > .05	Acceptable given sample size (N = 612)
χ^2/df	1.95	2.10	< 3.0	Excellent fit
CFI	.96	.95	≥ .95	Excellent fit
TLI	.95	.94	≥ .95 (≥ .90 acceptable)	Good fit
RMSEA [90% CI]	.043 [.036, .050]	.049 [.042, .056]	≤ .06	Excellent fit
SRMR	.039	.045	≤ .08	Excellent fit

NOTE. Note. N = 612. χ^2 = chi-square fit statistic; df = degrees of freedom; CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error of approximation; CI = confidence interval; SRMR = standardized root mean square residual.

The proposed CB-SEM model demonstrated an acceptable fit to the observed data (Table 6). The chi-square test was significant, $\chi^2(170) = 356.84$, $p < .001$; however, because the chi-square statistic is sensitive to sample size, fit was evaluated using multiple complementary indices. The relative chi-square value indicated adequate fit ($\chi^2/df = 2.10$). The model showed good incremental fit (CFI = .95; TLI = .94) and low residual error (RMSEA = .049; SRMR = .045), meeting commonly recommended SEM criteria. Overall, the fit indices supported the adequacy of the specified structural model for testing the hypothesized relationships.

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Structural path coefficients and hypothesis testing

TABLE 7. Structural parameter estimates and direct model paths.

Structural Path	Unstandardized Estimate (B)	SE	Critical Ratio (CR)	Standardized Estimate (β)	P	95% Bootstrap CI
Hypothesized Direct Paths						
H1: Professional Identity → Autonomous Motivation	0.58	.04	13.87	.62	< .001	[.53, .70]
H2: Autonomous Motivation → Teacher Self-Efficacy	0.51	.05	11.94	.55	< .001	[.45, .64]
H3: Teacher Self-Efficacy → Perceived Competence-Based Curriculum Implementation	0.44	.05	10.42	.48	< .001	[.38, .57]
ADDITIONAL DIRECT PATHS INCLUDED IN THE MEDIATION MODEL						
Autonomous Motivation → Perceived Competence-Based Curriculum Implementation	0.18	.04	4.25	.19	< .001	[.11, .27]
Professional Identity → Teacher Self-Efficacy	0.21	.04	5.25	.24	< .001	[.15, .32]
Professional Identity → Perceived Competence-Based Curriculum Implementation	0.16	.04	4.10	.18	< .001	[.08, .28]
ENDOGENOUS CONSTRUCTS EXPLAINED VARIANCE (R^2)						
Endogenous Construct						R^2
Autonomous Motivation						.38
Teacher Self-Efficacy						.44
Perceived Competence-Based Curriculum Implementation						.46

NOTE. Note. N = 612. B = unstandardized estimate; SE = standard error; CR = critical ratio; β = standardized estimate; CI = confidence interval; R^2 = proportion of variance explained; PCBCI = perceived competence-based curriculum implementation. The 95% bias-corrected bootstrap confidence intervals were estimated using 5,000 bootstrap resamples in AMOS.

The structural path estimates obtained from the CB-SEM analysis are presented in Table 7. All hypothesized direct relationships were statistically significant and supported. Professional identity showed a significant positive effect on autonomous motivation (β = .62, SE = .04, CR = 13.87, p < .001), explaining 38% of the variance in autonomous motivation (R^2 = .38), thus supporting H1.

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Autonomous motivation also demonstrated a significant positive relationship with teacher self-efficacy (β = .55, SE = .05, CR = 11.94, p < .001), accounting for 44% of the variance in teacher self-efficacy (R^2 = .44), providing support for H2. Furthermore, teacher self-efficacy significantly predicted PCBCI (β = .48, SE = .05, CR = 10.42, p < .001), explaining 46% of the variance in PCBCI (R^2 = .46), supporting H3.

In addition to the hypothesized paths, the mediation model showed significant direct associations of autonomous motivation with PCBCI (β = .19, p < .001), professional identity with teacher self-efficacy (β = .24, p < .001), and professional identity with PCBCI (β = .18, p < .001). These additional paths were retained because they are necessary to estimate the proposed indirect effects within the serial mediation framework.

The structural model results provide empirical support for the proposed theoretical sequence in which professional identity is associated with autonomous motivation, which is subsequently associated with teacher self-efficacy and, in turn, with perceived competence-based curriculum implementation testing the hypothesized relationships.

Serial mediation analysis

To further investigate the mechanism through which professional identity was associated with PCBCI, a serial mediation analysis was conducted within the CB-SEM framework. Using bias-corrected bootstrapping with 5,000 resamples, the analysis estimated the direct, specific indirect, serial indirect, and total effects of professional identity on PCBCI. Specifically, the proposed mediation model examined whether autonomous motivation and teacher self-efficacy sequentially mediated the relationship between professional identity and PCBCI, thereby providing a test of the proposed motivational and efficacy-based pathway underlying curriculum implementation.

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TABLE 8. Standardized direct, indirect, and total effects of professional identity on perceived competence-based curriculum implementation.

Effect / Structural Pathway	**Standardized Effect (β)**	**Bootstrap SE**	**95% Bias-Corrected CI**	**P**
DIRECT EFFECT				
Professional Identity → Perceived CBC Implementation	.18	.05	[.08, .28]	< .001
SPECIFIC INDIRECT EFFECTS				
Professional Identity → Autonomous Motivation → Perceived CBC Implementation	.12	.03	[.07, .18]	< .001
Professional Identity → Teacher Self-Efficacy → Perceived CBC Implementation	.12	.03	[.05, .16]	< .001
SERIAL INDIRECT EFFECT				
Professional Identity → Autonomous Motivation → Teacher Self-Efficacy → Perceived CBC Implementation	.16	.03	[.11, .22]	< .001
SUMMARY EFFECTS				
Total Indirect Effect (Σ Indirect)	.38	.04	[.30, .46]	< .001
Total Effect (Direct + Total Indirect)	.56	.05	[.46, .66]	< .001

NOTE. N = 612. Indirect effects were estimated using 5,000 bootstrap resamples in AMOS. β = standardized effect; SE = standard error; CI = confidence interval; PCBCI = perceived competence-based curriculum implementation. Bias-corrected 95% confidence intervals are reported. Indirect effects were considered statistically significant when the 95% confidence interval did not include zero.

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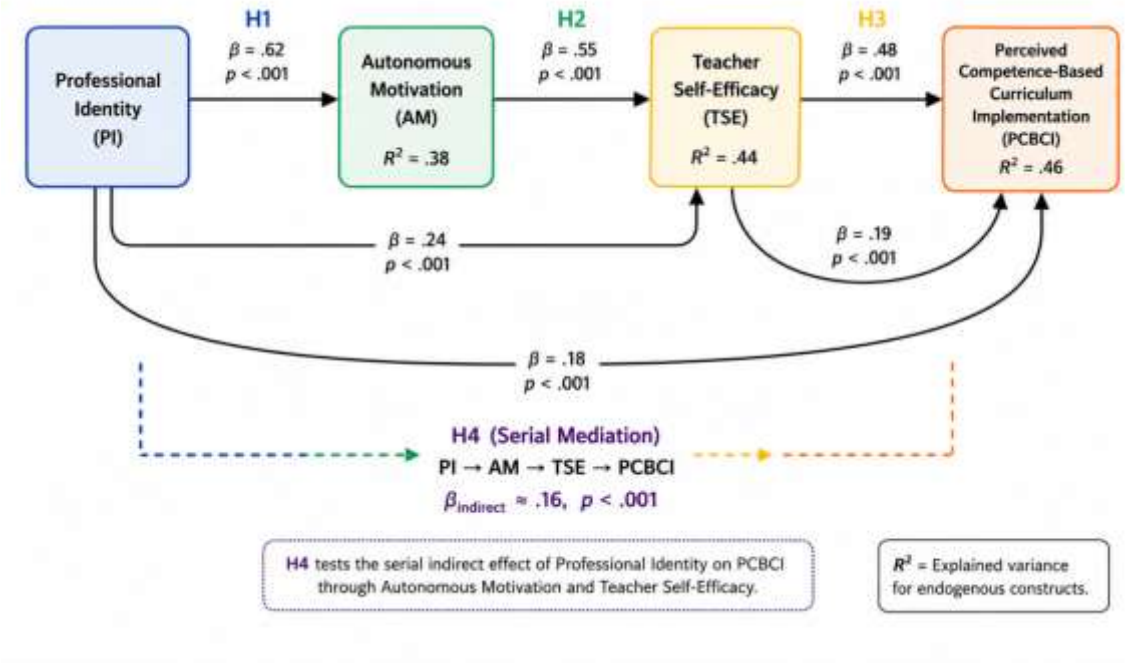


FIGURE 1. Serial Mediation Model of Teachers' Perceived Competence-Based Curriculum Implementation
NOTE. All paths are standardized estimates (β); N = 612; All paths are statistically significant at p <.001.

The indirect effects estimated through CB-SEM are presented in Table 8. The direct effect of professional identity on PCBCI remained statistically significant (β = .18, Boot SE = .05, 95% CI [.08, .28], p < .001), indicating that the relationship between professional identity and PCBCI was not fully accounted for by the proposed mediators.

The specific indirect effects were also statistically significant. Professional identity was indirectly associated with PCBCI through autonomous motivation (β = .12, Boot SE = .03, 95% CI [.07, .18], p < .001) and through teacher self-efficacy (β = .12, Boot SE = .03, 95% CI [.05, .16], p < .001). More importantly, the hypothesized sequential mediation pathway from professional identity to autonomous motivation, then to teacher self-efficacy, and finally to PCBCI was statistically significant (β = .16, Boot SE = .03, 95% CI [.11, .22], p < .001). Because the confidence interval did not include zero, H4 was supported.

Taken together, these findings indicate that the association between professional identity and perceived competence-based curriculum implementation operates partly through a sequential motivational and efficacy-based pathway. Specifically, stronger professional identity

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was associated with greater autonomous motivation, which was in turn associated with stronger teacher self-efficacy, which was subsequently associated with greater perceived competence-based curriculum implementation.

Structural Model Representation

The estimated structural model and standardized path coefficients are presented in Figure 1. Overall, the results demonstrated a coherent pattern of positive and statistically significant associations among the study constructs. Professional identity was positively associated with autonomous motivation ($\beta = .62$, $p < .001$; $R^2 = .38$), which, in turn, was positively associated with teacher self-efficacy ($\beta = .55$, $p < .001$; $R^2 = .44$). Teacher self-efficacy was subsequently positively associated with PCBCI ($\beta = .48$, $p < .001$; $R^2 = .46$), supporting H1–H3. Beyond these sequential associations, professional identity was also positively associated with teacher self-efficacy ($\beta = .24$, $p < .001$) and curriculum implementation ($\beta = .18$, $p < .001$), while autonomous motivation was positively associated with curriculum implementation ($\beta = .19$, $p < .001$). The sequential indirect effect was significant ($\beta = .16$, $p < .001$), supporting H4 and confirming the indirect pathway from professional identity to curriculum implementation through autonomous motivation and teacher self-efficacy.

Discussion

Main findings and theoretical contribution

The present study examined a sequential mediation model of perceived competence-based curriculum implementation (PCBCI) among Physical Education teachers, focusing on the relationships among professional identity, autonomous motivation, and teacher self-efficacy. Using covariance-based structural equation modeling (CB-SEM), the results supported the hypothesized model, revealing significant associations among the constructs and significant indirect effects of professional identity on PCBCI through autonomous motivation and teacher self-efficacy. The model explained 46% of the variance in PCBCI ($R^2 = .46$), underscoring the relevance of interconnected teacher-related psychological factors in

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understanding curriculum enactment. Collectively, these findings suggest that PCBCI is associated with an interconnected set of professional, motivational, and efficacy-related factors rather than with isolated teacher characteristics.

These findings provide a basis for a broader theoretical interpretation of curriculum enactment. By integrating Self-Determination Theory, Social Cognitive Theory, and Didactic Theory in Physical Education, this study extends predominantly structural, organizational, and policy-oriented accounts of curriculum implementation (Priestley et al., 2015; Voogt & Pareja Roblin, 2012) by highlighting the interconnected roles of professional identity, motivation, and efficacy in teachers' interpretation and enactment of curriculum implementation. This perspective is consistent with evidence that teachers' engagement with educational innovations involves processes of ownership, sense-making, and agency rather than compliance with external reform requirements alone (Ketelaar et al., 2012). Accordingly, the findings support a more psychologically informed understanding of curriculum enactment in Physical Education, in which teachers' professional orientations, motivational dispositions, and efficacy beliefs are associated with how curriculum reforms are interpreted and enacted in practice. Given the cross-sectional design, however, these relationships should be interpreted as theoretically consistent associations rather than as evidence of causal effects or temporal ordering.

Professional identity shaping teachers' curriculum engagement

The positive association between professional identity and autonomous motivation indicates that teachers' professional self-understanding is meaningfully related to their motivational engagement with curriculum reform. Professional identity encompasses teachers' values, beliefs, commitment, and sense of belonging (Hanna et al., 2019; Akkerman & Meijer, 2011; Beijaard et al., 2004), and has been associated with motivation, commitment, and professional functioning (Canrinus et al., 2012). From the perspective of Self-Determination Theory, this relationship may reflect greater value congruence: teachers who identify strongly with their profession may be more likely to perceive competence-based curriculum reforms as consistent with their professional purposes rather than as externally imposed demands (Ryan & Deci, 2020).

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In the context of Physical Education, competence-based curricula emphasize student participation, meaningful learning, competency development, and adaptive pedagogical decision-making (Casey & MacPhail, 2018; Metzler, 2017). Thus, stronger professional identification may facilitate teachers' internalization of reform goals and their willingness to translate them into meaningful instructional practices. This interpretation aligns with recent evidence emphasizing the importance of teachers' pedagogical choices in effective Physical Education curriculum enactment (Derbali & Shahidi, 2025). Moreover, it is consistent with contemporary perspectives on teacher agency and curriculum implementation, which conceptualize teachers as active interpreters of curriculum policy who reconstruct curricular intentions in relation to their professional beliefs and contextual realities (Priestley et al., 2015). Recent Physical Education research similarly indicates that student-centered and creative approaches require teachers to actively interpret curriculum goals rather than merely reproduce prescribed procedures (Derbali, 2026).

Moreover, the findings suggest that professional identity, autonomous motivation, and teacher agency are interconnected dimensions of teachers' engagement with competence-based curriculum implementation. However, because the study is cross-sectional, the observed relationship should be interpreted as an association rather than evidence of temporal or causal influence. Longitudinal and intervention research is needed to determine whether professional identity promotes autonomous motivation, whether sustained curriculum engagement strengthens professional identity, or whether these processes develop reciprocally over time.

The mediating role of autonomous motivation

The significant positive relationship between autonomous motivation and teacher self-efficacy indicates that the quality of teachers' motivation is an important correlate of their perceived instructional capability within competence-based curriculum contexts. Consistent with SDT, autonomous motivation reflects the extent to which professional activities are personally valued and self-endorsed, supporting greater persistence, engagement, and adaptive functioning (Ryan & Deci, 2020). Previous research in Physical Education has shown that autonomous motivation is associated with greater adoption of innovative pedagogical

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approaches and stronger support for student-centered learning environments (Fierro-Suero et al., 2024; Spittle et al., 2022; Cheon et al., 2014). Accordingly, the findings extend this evidence by suggesting that teachers' motivational orientations are statistically associated not only with instructional engagement but also with their perceived capability to respond to curriculum demands.

Moreover, this association can be interpreted through Social Cognitive Theory (Bandura, 1977), which emphasizes that self-efficacy beliefs are shaped through individuals' experiences, persistence, and interpretation of successful performance. Teachers who are autonomously motivated may be more inclined to engage actively with pedagogical challenges, reflect on their teaching practices, and seek opportunities for professional learning, thereby creating experiences that may reinforce efficacy beliefs. Thus, autonomous motivation may represent an important psychological link between professional identity and teacher self-efficacy. In Physical Education, where competence-based curriculum implementation requires teachers to modify instructional strategies, redesign learning situations, and adopt more adaptive teaching approaches, this motivational pathway offers a theoretically meaningful explanation for differences in teachers' perceived readiness to engage with curriculum enactment.

Teacher self-efficacy as a proximal predictor of curriculum implementation

Teacher self-efficacy showed the strongest standardized direct association with PCBCI among the principal hypothesized paths ($\beta = .48$, $p < .001$), highlighting the importance of teachers' perceived instructional capability in understanding perceived curriculum enactment. This finding is consistent with Social Cognitive Theory, which identifies efficacy beliefs as central factors influencing professional behavior, persistence, and adaptation in complex situations (Bandura, 1997). Previous studies have demonstrated that teacher self-efficacy is related to instructional quality, classroom management, student engagement, and openness toward educational innovation (Zee & Koomen, 2016; Tschannen-Moran & Hoy, 2001; Klassen & Tze, 2014), while teachers' professional competence and self-efficacy beliefs are also closely associated with professional functioning, including well-being, instructional effectiveness, and

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the ability to cope with professional demands (Lauermann & König, 2016). Accordingly, the present study extends this literature by showing that self-efficacy can be incorporated into an integrated psychological framework linking teachers' professional identity and motivation with their perceptions of curriculum implementation.

In the context of competence-based PE, teachers are required to design meaningful learning experiences, evaluate competency development, manage diverse learners and continuously adjust instructional decisions. Such demands require confidence in one's ability to translate curriculum principles into effective pedagogical practices. Accordingly, teachers with stronger efficacy beliefs may perceive themselves as better equipped to implement competence-oriented approaches. Recent findings suggest that effective PE teaching requires teachers to select and adapt instructional strategies according to students' needs and learning objectives, reinforcing the importance of teachers' perceived capability in implementing innovative pedagogical approaches (Derbali & Shahidi, 2025). Thus, the findings support teacher self-efficacy as a proximal psychological correlate of perceived curriculum implementation.

A sequential mediation model of curriculum implementation

The significant sequential indirect effect provides support for the proposed model in which professional identity is associated with PCBCI through autonomous motivation and teacher self-efficacy. While previous studies have often examined these constructs separately, the present findings indicate that they can be statistically integrated into a sequential psychological pathway associated with teachers' perceptions of curriculum enactment. The mediation model suggests a theoretically meaningful sequence: professional identity is positively associated with teachers' motivational orientations; autonomous motivation is positively associated with stronger efficacy beliefs; and teacher self-efficacy is positively associated with perceived implementation of competence-based curriculum practices. The serial indirect effect was statistically significant (β = .16, 95% CI [.11, .22]), while the total indirect effect was also significant (β = .38, 95% CI [.30, .46]), indicating that professional

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identity was associated with PCBCI through multiple indirect pathways, including autonomous motivation and teacher self-efficacy separately and their sequential combination.

Importantly, the direct association between professional identity and PCBCI remained statistically significant ($\beta = .18$, $p < .001$) after the mediating variables were included. This pattern is consistent with partial statistical mediation, indicating that the relationship between professional identity and PCBCI was not completely accounted for by autonomous motivation and teacher self-efficacy. Thus, other psychological, professional, or contextual mechanisms may also contribute to teachers' perceptions of curriculum implementation. This perspective contributes to curriculum implementation research by highlighting that reform engagement involves not only external curriculum requirements but also teachers' internal psychological resources and professional interpretations. Consistent with Didactic Theory in Physical Education, curriculum implementation involves teachers' active interpretation, adaptation, and reconstruction of curricular intentions according to pedagogical judgment and contextual demands (Rovegno, 2006; Amade-Escot, 2000).

From a structural-agentic perspective, competence-based curriculum implementation can also be understood as a dynamic process resulting from the interaction between external curriculum structures and teachers' professional agency, whereby educators interpret, negotiate, and transform curricular expectations according to their professional knowledge and contextual realities (Derbali, 2026b). This interpretation aligns with research on teacher professional identity, emphasizing that teachers' self-understanding, professional values, and perceptions of their role influence how they interpret and respond to educational demands (Kelchtermans, 2009). Accordingly, PCBCI may be understood as a multidimensional process associated with the interaction between external reform expectations and teachers' professional, motivational, and efficacy-related resources.

Theoretical and practical implications

The present study contributes theoretically by integrating complementary perspectives to explain perceived competence-based curriculum implementation in Physical Education. Self-Determination Theory highlights teachers' internalized motivation and professional values,

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Social Cognitive Theory explains the role of perceived capability in instructional action, and Didactic Theory emphasizes teachers' active role in interpreting and reconstructing curriculum requirements within practice contexts. Together, these perspectives provide a comprehensive understanding of curriculum implementation as a process associated with teachers' psychological resources, professional meanings, and pedagogical agency.

From a practical perspective, the findings suggest that curriculum reform initiatives should move beyond approaches focused exclusively on technical curriculum knowledge. Professional development programs may benefit from strengthening teachers' professional identity and autonomous motivation while providing opportunities to develop instructional confidence through collaboration, reflection, guided practice, and meaningful teaching experiences. Recent evidence similarly emphasizes the importance of preparing Physical Education teachers for creative and student-centered pedagogies, which require adaptive instructional competencies (Derbali, 2026a). Accordingly, professional development for competence-based Physical Education curricula could be designed as a sustained process integrating curriculum knowledge, professional identity, autonomous motivation, and instructional efficacy rather than treating these domains independently, consistent with evidence emphasizing content focus, active learning, collaboration, sustained duration, and ongoing support as key features of effective professional development (Desimone, 2009; Sims et al., 2025).

Limitations and future research directions

Several limitations warrant consideration. First, the cross-sectional design and CB-SEM approach permit the examination of theoretically specified relationships and indirect effects but do not establish causality or temporal ordering among the study variables. Longitudinal and intervention studies are therefore needed to examine how professional identity, autonomous motivation, teacher self-efficacy, and curriculum implementation develop and influence one another over time. Second, reliance on self-report measures, including PCBCI, may introduce common method variance and social desirability bias. Future research should triangulate self-

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reports with classroom observations, external evaluations, student reports, and qualitative data to strengthen the assessment of curriculum enactment.

Third, the focus on Physical Education teachers within the Tunisian competence-based curriculum context may limit generalizability across disciplines, educational systems, and cultural settings. Future studies should test the model across diverse contexts and consider factors such as school leadership, organizational support, curriculum autonomy, and professional learning environments. Fourth, reliance on perceived rather than independently verified curriculum implementation may introduce shared perceptual bias; future research should incorporate classroom observations, lesson-plan analyses, assessment records, and other behavioral indicators. Finally, the model focused primarily on teacher-level psychological mechanisms and excluded contextual influences such as resources, collegial collaboration, policy coherence, and professional development opportunities. Multilevel and longitudinal designs could address these contextual influences.Despite these limitations, the study provides empirical support for an integrated psychological model of perceived competence-based curriculum implementation, highlighting the relevance of professional identity, autonomous motivation, and teacher self-efficacy in understanding teachers' engagement with curriculum implementation.

Conclusion

This study provides empirical support for a theoretically grounded sequential model of perceived competence-based curriculum implementation (PCBCI) among Physical Education teachers. The findings indicate that PCBCI is associated with an interconnected pattern involving professional identity, autonomous motivation, and teacher self-efficacy. Rather than being understood solely as a technical process of applying curriculum requirements, competence-based implementation appears to be associated with how teachers interpret, value, and engage with curriculum through their professional beliefs and psychological resources.

By integrating Self-Determination Theory, Social Cognitive Theory, and Didactic Theory in Physical Education, this study contributes to curriculum implementation research by providing a comprehensive perspective on the psychological factors associated with teachers'

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engagement with curriculum implementation. The findings indicate that professional identity is associated with PCBCI through a sequential pathway involving autonomous motivation and teacher self-efficacy, while the significant direct association indicates partial rather than complete statistical mediation. Thus, additional psychological, professional, or contextual mechanisms may contribute to teachers' perceptions of curriculum implementation.

The findings highlight the importance of considering teachers' psychological resources alongside curriculum knowledge and technical preparation. Practically, supporting competence-based curriculum implementation may require professional development that extends beyond curriculum knowledge to strengthen professional identity, foster autonomous motivation, and enhance teacher self-efficacy through collaborative, reflective, and sustained learning opportunities. Overall, the study provides a theoretically informed framework for understanding how teachers' professional role, autonomous engagement, and perceived capability are associated with competence-based curriculum implementation in Physical Education.

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